Dorsey-Riel Transmission Link

Route Selection and Environmental Assessment Status Report

Conawapa to Winnipeg
Power Transmission Complex

manitoba hydro

92-07159/

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Manitoba Hydro's Development Plan

Manitoba Hydro is currently pursuing a number of long-term capital investment and conservation initiatives. These are intended to meet projected consumer needs into the next century and to improve the security and reliability of the province's electrical system.

Part of Hydro's capital plan is to build the 1390 megawatt Conawapa Generating Station on the Nelson River, downstream from the soon-to-be-completed Limestone project. This facility will generate needed power for both projected demand within Manitoba and committed sales to Ontario and the United States.

Also proposed is development of the Conawapa-Winnipeg Power Transmission Complex, known technically as the Bipole III Complex.

The Conawapa-Winnipeg Power Transmission Complex

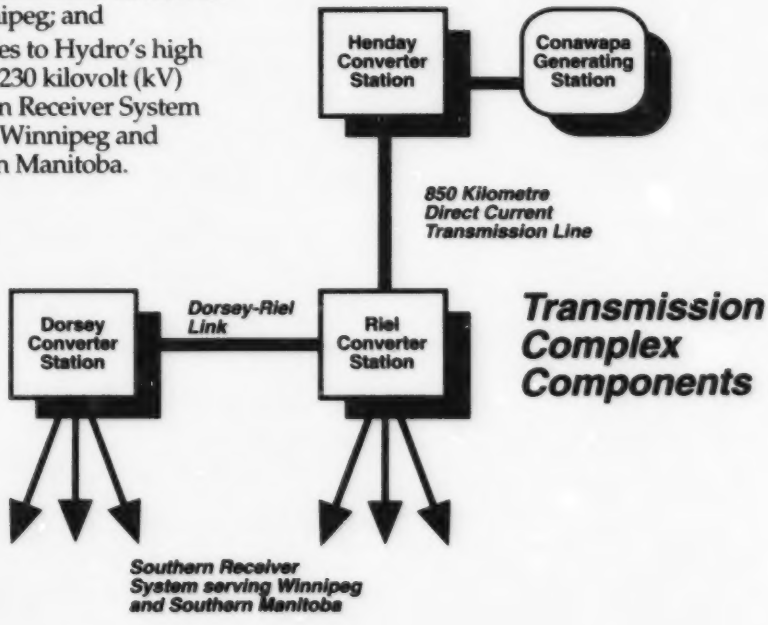
This major development includes five interrelated transmission and conversion facilities:

- An upgrade of the existing Henday Converter Station on the Nelson River;
- An estimated 850-kilometre HVDC (High Voltage Direct Current) transmission line from Henday to Winnipeg, known as Bipole III;
- A new converter station east of Winnipeg, known as Riel Converter Station;
- A transmission link between Riel and the existing Dorsey Converter Station northwest of Winnipeg; and
- Upgrades to Hydro's high voltage 230 kilovolt (kV) Southern Receiver System serving Winnipeg and southern Manitoba.

Purposes

This Transmission Complex has three purposes:

- To convey power from Conawapa or other northern generating facilities to Hydro's receiving system in southern Manitoba;
- To increase the flexibility of Hydro's transmission network during normal operations; and
- To improve Hydro's capacity to service its customers in the event that part of its network is disrupted by an outage or by maintenance requirements.



The Dorsey-Riel Transmission Link Study

This booklet describes work done to date on one component of the Complex — the Dorsey-Riel Transmission Link. Over the past year, Manitoba Hydro and its consultant team have been engaged in a route selection analysis and environmental impact assessment for this new transmission line.

Two potential routes, both on existing Manitoba Hydro rights-of-way, have been examined and compared. The North Route contains operating transmission lines to the north and east of Winnipeg. The South Route, while used by Hydro west of the city, is not yet developed south and east of Winnipeg. Manitoba Hydro ultimately intends to construct new transmission lines on both routes as part of a planned ring of facilities around the city.

At this time, Hydro's preliminary conclusion is that the Dorsey-Riel Link should be constructed on the North Route. This choice is based primarily on the lower cost of development along the northern right-of-way. There is little significant difference between the two routes in terms of potential environmental impacts.

Manitoba Hydro invites public discussion and comment on its analysis and conclusions.

Future Development

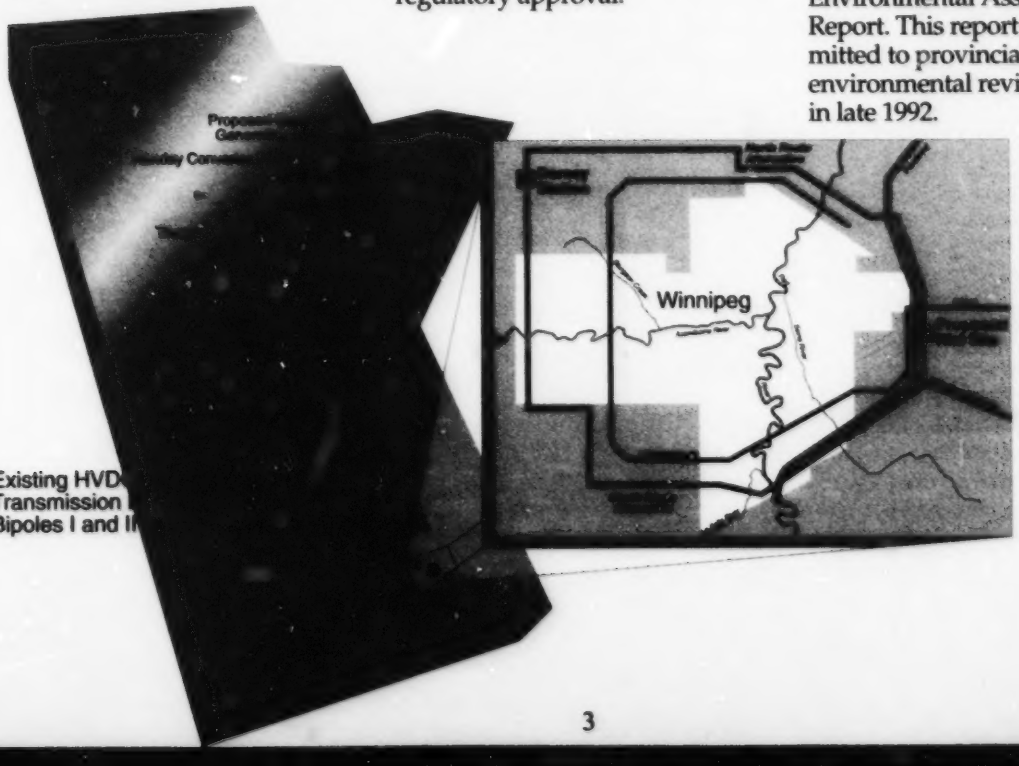
Irrespective of whether the Dorsey-Riel Link is established on the North or South Route, the remaining right-of-way is intended to be gradually developed in accordance with Hydro's Winnipeg-area ring concept. Such subsequent development would also be subject to regulatory approval.

Public Review and Consultation

This status report provides an information base for public consultation on the Dorsey-Riel Link. More detail will be available from Hydro's Environmental Management Division as the study proceeds.

Beginning in early 1992, Hydro's representatives will hold a series of community open houses and other meetings to discuss the routing evaluation and environmental issues related to the Link. Area residents, property owners, farmers, environmental groups, government officials, and other interested parties are invited to participate.

Feedback received during these meetings will assist Hydro in its preparation of the final Dorsey-Riel 500 kV Transmission Link Route Selection and Environmental Assessment Report. This report is to be submitted to provincial and federal environmental review authorities in late 1992.



Existing HVD
Transmission
Bipoles I and I

The Dorsey-Riel Link

Delivery of power from the proposed Conawapa Generating Station to southern Manitoba will require a new ±500 kV HVDC transmission line (Bipole III) from Henday Station on the Nelson River to a new southern terminus — Riel Station — where the power can be converted and transformed to appropriate voltages for transmission to Hydro's Southern Receiver System.

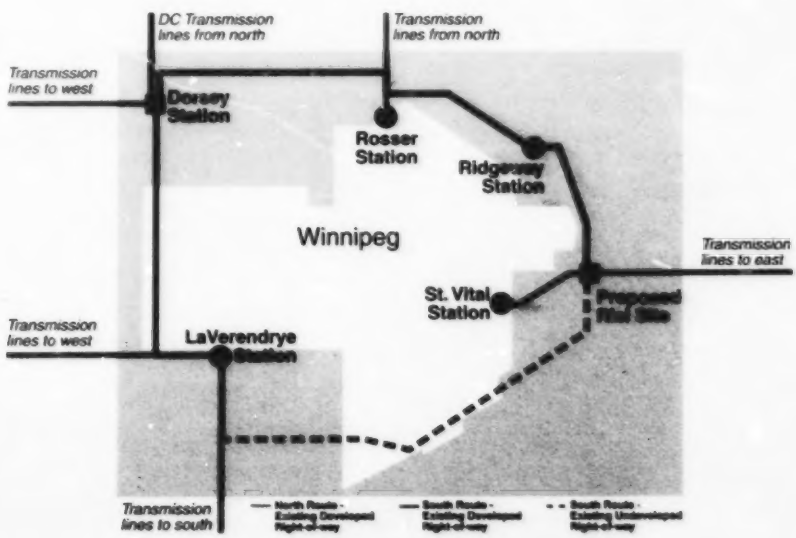
To further improve the operation and security of its transmission network, Hydro plans to develop a new 500 kV high voltage line capable of transmitting either direct current (DC) or alternating current (AC) power between Riel and the existing Dorsey Converter Station. Current plans call for construction of this Dorsey-Riel Link to begin in 1998, with an in-service date in the year 2000.

Role within Hydro's Transmission Network

The Dorsey-Riel Link will be an integral part of Hydro's HVDC transmission network. This network is composed of high voltage transmission lines and station facilities that deliver DC power from northern Manitoba and convert it to AC power for consumer use. The HVDC system also provides the power needed for interconnections with utilities in other provinces and states.

The principal function of the Dorsey-Riel Link will be to provide a backup DC connection in the event of an equipment failure, natural event or disaster, or normal maintenance requirements. For example, if an outage were experienced on one of the major DC bipoles from northern Manitoba, the Link would enable the power, that would otherwise have been transmitted by the affected bipole, to be redirected to the unaffected bipole(s), and on to the intended converter station destination. In short, the Link's primary purpose is to enhance the reliability of the DC system.

The secondary purpose of the Dorsey-Riel Link is to reinforce the existing 230 kV AC Southern Receiver System in the Winnipeg area. During normal operating conditions (i.e. with no bipole interruptions), the Link will thus function as a high voltage AC transmission line operating at either 230 kV or 500 kV.



In summary, the Dorsey-Riel Link will satisfy two of the system's principal needs by:

1. Enhancing Hydro's capacity to maintain DC transmission to its two Winnipeg-area converter stations; and
2. Improving the system's flexibility and reliability in transmitting AC power to major 230 kV transformer stations in the Winnipeg area.

Ultimately, Manitoba Hydro plans to serve the Southern Receiver System with a ring of transmission lines and facilities around Winnipeg. The ring's purpose is to ensure that all major transformer stations and system interconnections are linked to both a high capacity power source and a comparable back-up by at least two separate high voltage circuits. Whether located north or south of the city, the Dorsey-Riel Link will supplement the ring concept.

Project Design

Final engineering design for the Dorsey-Riel Link will not be completed until after project approval. At this time, however, it is assumed that the new transmission line will consist of three metallic conductors strung from self-supporting towers, probably of the lattice steel type. It would be similar in appearance to the existing 500 kV AC transmission line between Dorsey and the U.S. The span between towers typically will be about 400 metres. Spans may be longer in special circumstances, such as at highway and major river crossings (e.g. the Red River).

As the Link is to serve both as an HVDC connection and for AC transmission, special design features will be required to permit either ±500 kV DC, 500 kV AC, or 230 kV AC operation. Consequently, at both the Dorsey and Riel stations, additional circuit breakers, related termination equipment, control and protection equipment, and communications facilities will be installed in the DC switchyard, and in both the 230 kV and 500 kV AC switchyards.

Right-of-Way Requirements

Both north and south alternative routes for the Dorsey-Riel Link are located within existing rights-of-way owned by Manitoba Hydro.

To accommodate development of the Link, Hydro will have to acquire some additional land to widen portions of the selected right-of-way. In the case of the northern right-of-way, about eight hectares (20 acres) are needed north of the Rosser Station. The southern option would need about 140 hectares (345 acres). For full future implementation of the ring concept, another 20 hectares (50 acres) would be needed along the southern right-of-way.

This free-standing lattice tower design on an existing 500 kV line is likely to be similar to that used for the Dorsey-Riel Link.

These land acquisition estimates assume that the proposed Riel Station will be located at Hydro's preferred "Deacon Site". This site is adjacent to Provincial Road (PR) 207 immediately east of the Winnipeg Floodway and north of the City of Winnipeg's Deacon Water Supply Reservoir. If a different station location were selected, additional land would have to be obtained to extend the Link to the selected site.

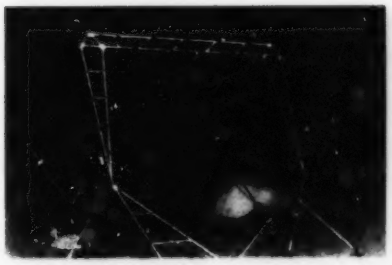
Hydro will proceed with any needed right-of-way acquisition for the Link only after regulatory approval has been received.

Line Clearing and Construction

Little right-of-way clearing will be required for the Dorsey-Riel Link. Most sections of the North and South Routes already contain transmission lines or are used for agricultural purposes. However, in some cases, selective clearing of small wooded areas, including river crossings, will be necessary.

Line construction will involve installation of tower foundations, tower assembly and erection, and conductor stringing. The timing of these activities, while technically feasible throughout the year, may be adjusted to accommodate agricultural operations, logistics, and equipment supply requirements.

Installation of the required switchyard equipment will occur during construction of the Riel Station and upgrading at Dorsey Station.



Construction of 500 kilovolt transmission lines and towers such as these will link the existing Dorsey and proposed Riel Converter stations. Their design will allow them to carry either direct or alternating current, depending on needs.

Potential Environmental Impacts

Manitoba Hydro's submission to regulatory authorities for the Dorsey-Riel Link will include an environmental evaluation of the two route alternatives as well as a detailed environmental impact assessment of the preferred route. Documentation will cover the project's potential physical, biological, social, cultural, and economic effects. It will also outline the management measures Hydro will take to protect the environment, avoid or minimize disruption of existing and future area land uses, and enhance positive impacts of the project.

Land Use and Property Impacts

Transportation and construction activities during project development could cause some adverse effects, such as noise, dust, soil compaction, and accidental release of pollutants. These potential impacts are expected to be avoided entirely or reduced to acceptable limits by using known technology and established Hydro policies and procedures. In the unlikely event that any adverse effects are experienced by nearby landowners, Hydro will provide appropriate mitigation and/or compensation.

It has been Hydro's experience, in the developed portions of each of the routes, that there has been little negative impact on agricultural land and farming practices. The addition of the Dorsey-Riel line is not expected to have any significantly greater impact. Post-construction agricultural use of the transmission line rights-of-way by former owners or adjacent farmers may continue to be permitted under standard lease terms and subject to Hydro's agreement with the Province for use of Winnipeg Floodway land.

The Link will have an unavoidable visual presence. As such, it may give rise to concerns about the uses, values, and general enjoyment of adjacent properties.

Biophysical Impacts

Along either route, the project would entail some disturbance of remnant natural vegetation and wildlife habitat. Disruption of rare plant or endangered bird species will be avoided or minimized by such measures as biological surveys prior to construction, careful placement of towers in the vicinity of sensitive areas, and strictly controlled right-of-way construction and maintenance practices. At river crossings, only those construction and maintenance activities will be undertaken that conform to all applicable regulatory requirements for protection of fish habitat and water quality.

Employment and Business Opportunities

The Dorsey-Riel Link will create an estimated 1,095 person-months in direct engineering and construction employment. This assumes selection of the North Route.

Total capital costs for the northern alternative are projected to be approximately $49 million (Year 2000 $), including installation of termination equipment at Dorsey and Riel.

The project's direct and indirect economic benefits to Manitoba are generally expected to accrue to the Winnipeg area. The magnitude of such benefits will depend, of course, on the level of project expenditure, as affected by the selected route and final project design.

Development of the Dorsey-Riel Link will involve significant construction activity and employment.

Line Operation and Maintenance

Operation and maintenance will involve routine monitoring, regular on-site inspection of the conductors and towers, and control of right-of-way vegetation as needed. Decisions as to the maintenance methods to be used will take into account site-specific conditions and sensitivities, including those of adjacent land uses.

Control of vegetation on the right-of-way will primarily be needed around the tower supports and rarely elsewhere, since almost all of the affected land is cleared and under cultivation by neighbouring farmers.

Should use of herbicides be required, their storage and application will be strictly controlled and will conform to federal and provincial government legislation. Only registered substances will be used by employees who hold an applicator's license issued by the Department of Environment. Application procedures will minimize or eliminate drifting of spray particles beyond the target area.

Electric and Magnetic Fields

As with any electrical equipment, electric and magnetic fields (EMF) will occur along the transmission line right-of-way. To date, the weight of scientific evidence on this subject has not established any cause-effect link between EMF exposure and adverse effects on human health. In recognition of the public's concerns, Hydro will continue to measure and predict EMF levels at its own facilities, to conduct its own EMF research, and to monitor world-wide scientific studies on the subject.

Wherever the Dorsey-Riel Link is routed, it will have essentially the same conductor size, equipment, and configuration. If ongoing research provides scientific evidence that indicates a need to modify existing practices, Manitoba Hydro will take whatever prudent measures are required to protect public and employee health and safety.

Measures will be taken during project design to mitigate the potential for electronic interference from EMF and to keep such effects within limits set by the Canadian Standards Association.

For route evaluation purposes, the study area for the Dorsey-Riel Link was defined as extending one kilometre on either side of the existing north and south rights-of-way. Project impacts, if experienced, would be most likely to occur within this area. If Riel Station is not located at the proposed "Deacon" site, however, the study area will have to be expanded to include additional rights-of-way.

To evaluate and compare the two routes within the study area, Manitoba Hydro undertook field studies of local flora, fauna, and potential archaeological resources. Maps, satellite images, aerial photos, property records, and other relevant information were also reviewed.

Study Area

The North and South routes lie largely outside the boundaries of the City of Winnipeg. In all cases, rights-of-way are located beyond the Perimeter Highway.

No major biophysical differences exist between the two routes in terms of topography, climate, soil conditions, natural vegetation, wildlife, and aggregate (sand and gravel) deposits. For most of their length, both routes traverse areas where original prairie and aspen parkland have been highly modified by various forms of agricultural and urban-related development. Such previous development has also altered the abundance and diversity of wildlife species.

Land use along both options is largely devoted to agriculture — mainly cereal grains, flax, and canola, with some hay production along the Floodway. There is some incidence of gardens and pasture land as well. At several locations, especially along the rivers and main roadways, continued suburban and rural non-agricultural development pressure is evident. Some localized industrial and recreational land uses also exist in the study area.

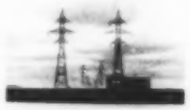
The Red, Assiniboine, and La Salle rivers, and the Winnipeg Floodway, are used for various seasonal recreational activities. In general, however, the study area has a low capability for outdoor recreation.

The nearest designated ecologically significant area is Beaudry Provincial Park, which lies west of Headingley. Although an extension of the park north of the Assiniboine River is within the western edge of the study area, transmission line development is not expected to have any significant impact on Beaudry.

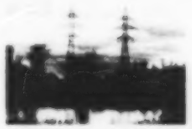
South Route Alternative

The South Route right-of-way is partially used by existing transmission lines from Dorsey Station to a point south of LaVerendrye Station. The remainder of the existing right-of-way is presently undeveloped.

1. Right-of-way crossing of the Trans-Canada Highway.



2. Right-of-way crossing of the Assiniboine River.

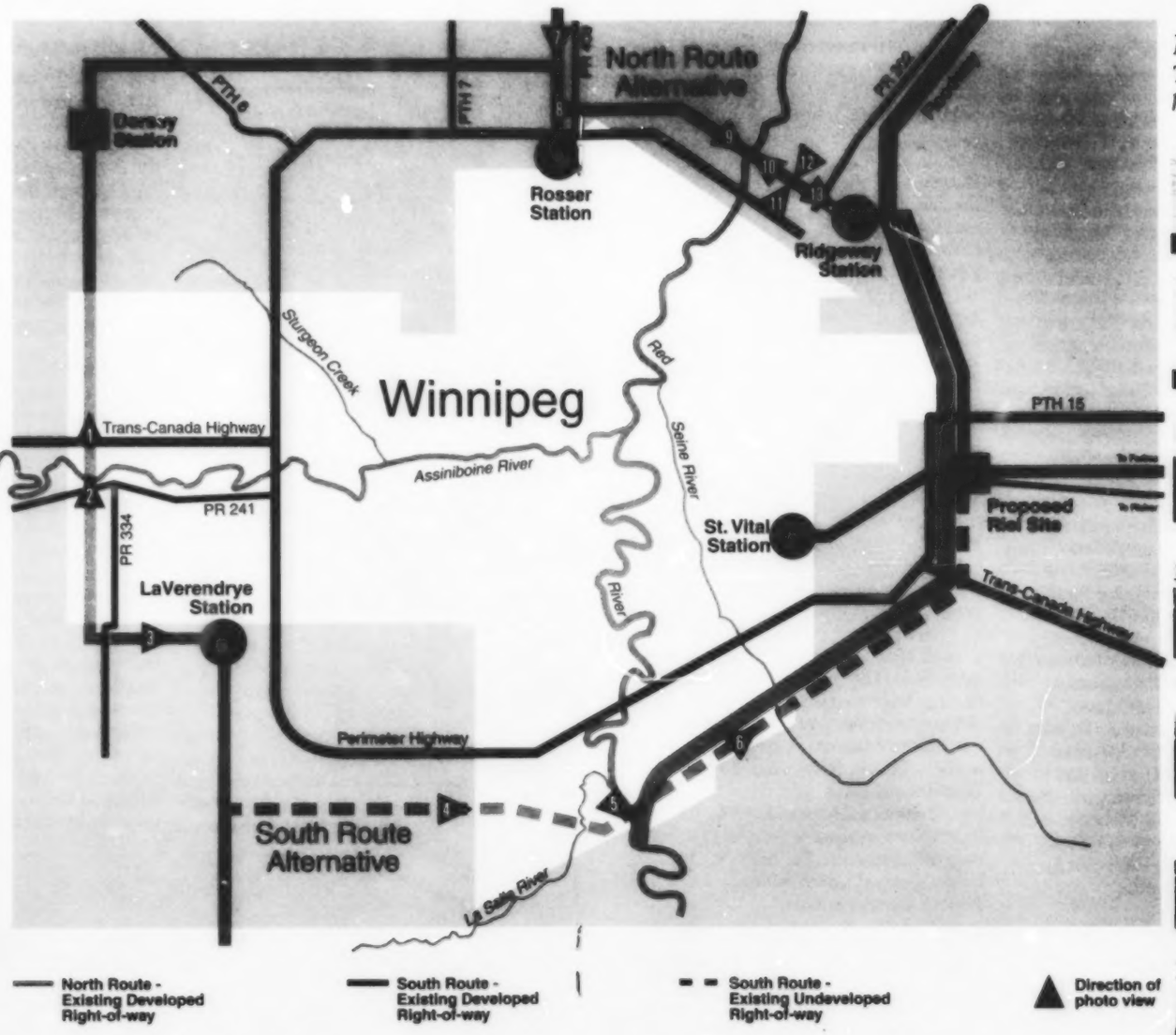


3. Right-of-way entering LaVerendrye Station (preceding recent transmission line development).

4. Creation of a new east-west right-of-way for the South Route would pass through cultivated agricultural land.

5. Possible crossing of Red River near to Floodway control structure.

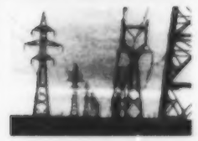
6. Newly developed right-of-way would parallel Floodway east of Red River.



North Route Alternative

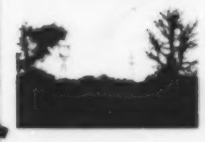
The entire North Route right-of-way is already partially occupied by existing transmission lines.

7. Link would cross existing hydro rights-of-way.



8. Existing right-of-way crosses Pipeline Road (PR 409).

9. Right-of-way crosses the Red River.



10. Right-of-way crosses Hyde Park east of the Red River.

11. Right-of-way passes north of Imperial Oil facility.

12. Right-of-way parallels south edge of residential subdivision in East St. Paul.

13. Right-of-way entering Ridgeway Station.

Route Comparison

The two alternative routes have been compared on the basis of technical, financial, socio-economic, and biophysical criteria, the most important of which were:

- *Extent of existing and future transmission line development;*
- *Proximity to existing and probable future urban and suburban development;*
- *Ability to avoid, wherever possible, any sensitive physical, biological, socio-economic, and cultural features;*
- *Extent of interference with existing infrastructure and land use practices;*
- *Route length; and*
- *Required river crossings.*

In most respects, the routes are very similar. The main differences between them are their length and, consequently, the estimated cost of development.

The North Route

The North Route is approximately 46 kilometres in length.

The route crosses four rural municipalities: Rosser, West St. Paul, East St. Paul and Springfield. It also crosses two water bodies (Omand's Creek and the Red River), the Winnipeg Floodway, and a number of highways, roads, railway lines, land drains, and transmission lines.

The principal facilities now occupying the right-of-way are the Dorsey-Forbes 500 kV Manitoba-United States Interconnection and a double-circuit 230 kV transmission line between Rosser and Ridgeway stations and from Ridgeway to the proposed Riel site.

The western half of the route mainly traverses agricultural lands interspersed with farm houses, some clusters of rural non-farm residential development, City of Winnipeg sewage sludge beds, and other industrial development. Adjacent to and east of the Red River, development is more intense and urban in nature. This includes areas designated for suburban and rural residential development in the vicinity of Middlechurch and Birds Hill; major road and rail transportation corridors; and some industrial lands.

Between Henderson Highway (PR 204) and Ridgeway Station, portions of the route parallel railway tracks that physically separate the right-of-way from lands to the south. From Ridgeway Station to the proposed Riel site, the route incorporates surplus property on the east side of the Floodway, which serves as a buffer to land uses to the west.

Some remnant aspen stands and areas of native prairie flora occur within or near the North Route, e.g., between Provincial Trunk Highways (PTHs) 6 & 7; in the vicinity of Birds Hill Road (PR 202); and between Ridgeway Station and PTH 15. Habitat along Pipeline Road (PR 409) adjacent to the right-of-way is an important breeding area for a threatened bird species, the loggerhead strike. The right-of-way also crosses an ash-oak forest area at the Red River.

The banks of the Red River in the vicinity of the right-of-way crossing are known to be rich in heritage resources. Suburban development, however, has limited the number of intact sites and artifacts. During field studies for the Dorsey-Riel Link, a new archaeological site was discovered at the North Route's crossing of the river near Middlechurch. The find has been registered with Manitoba's Historic Resources Branch.

The South Route

The South Route is approximately 66 kilometres in length.

The route crosses portions of the City of Winnipeg and the four rural municipalities of Rosser, Macdonald, Ritchot, and Springfield. It also crosses four water bodies (Sturgeon Creek, the Assiniboine, La Salle, and Red rivers), the Winnipeg Floodway, and a number of highways, roads, railway lines, land drains, and transmission lines.

Between Dorsey and LaVerendrye stations, the right-of-way contains two double-circuit 230 kV lines and, for part of its length, one double circuit and one single-circuit 230 kV line. From LaVerendrye south, the route is occupied by a 230 kV line to Letellier and, for part of that section, a 115 kV line to Morden. The remainder of the right-of-way, from the Letellier line to the Riel site, is unoccupied.

Much of the right-of-way on the western side of Winnipeg traverses agricultural areas with minimal non-farm development. However, the route passes within 0.4 kilometres of the residential portion of the Sturgeon Creek Hutterite Colony. It also extends through a partially developed residential area between the Assiniboine River and Roblin Boulevard (PR 241), 0.4 kilometres west of South Headingley.

From LaVerendrye Station to La Salle River, agricultural land uses again dominate, although small acreage development is increasingly prevalent as the route moves eastward toward St. Norbert. The route cuts through property expropriated for the City's Brady sanitary landfill and through a large tract of land held by a development company west of La Salle River.

East of La Salle River and north of the Floodway, land use is somewhat more intense and diverse in character. Between the Red River and the Riel Station site, the route occupies a Hydro reserve along the south side of the Floodway, which serves as a buffer for residences to the north. Agricultural activity prevails to the south.

Notable areas of native prairie flora and other natural vegetation, providing remnant habitats for wildlife, occur at several points along the route — in particular, at the Assiniboine, La Salle, and Seine river crossings, in the vicinity of the Red River, along the abandoned Canadian National Railways Harte line south of Headingley, and between PR 334 and LaVerendrye Station.

The relatively diverse river-bottom forest along La Salle River provides some of the best wildlife habitat in the study area. This habitat, as well as the Seine River area, is the least disturbed of the river crossings examined. In contrast, for example, habitat in the vicinity of the South Route's Red River crossing is considered less sensitive because of the existing impact of the Floodway's control structure.

The Preferred North Route

While both routes are ultimately intended to be developed in accordance with the Winnipeg-area ring concept, Hydro favours the use of the North Route now for construction of the Dorsey-Riel Link.

This preference is based principally on cost and land use factors. Significant environmental impact distinctions between the two routes are few. Possible adverse impacts are predominantly construction related and are considered to be generally mitigable.

Technical and Cost Factors

The most obvious advantage of the North Route is that it is 20 kilometres shorter in length than the southern option. The North Route also requires less additional property, fewer water crossings, and fewer major angle towers.

These physical and technical characteristics make the North Route the least-cost option. As the estimated costs per kilometre of basic transmission line construction are the same for either route, given their similar topography and soil conditions, on this criterion alone the North Route would be in the order of 30 per cent cheaper than the South Route.

The two routes are indistinguishable in terms of system planning and reliability considerations.

Biophysical Factors

Both routes contain ecologically sensitive areas. The North Route has more relatively large stands of aspen and native prairie. It is also adjacent to nesting habitat known to be used by the loggerhead strike. Sensitive sites along the South Route are primarily river-bottom forest and related riparian habitat.

Construction of the Link on the North Route may have to be timed to avoid possible adverse effects on nesting pairs of loggerhead strike.

Land Use and Visual Impacts

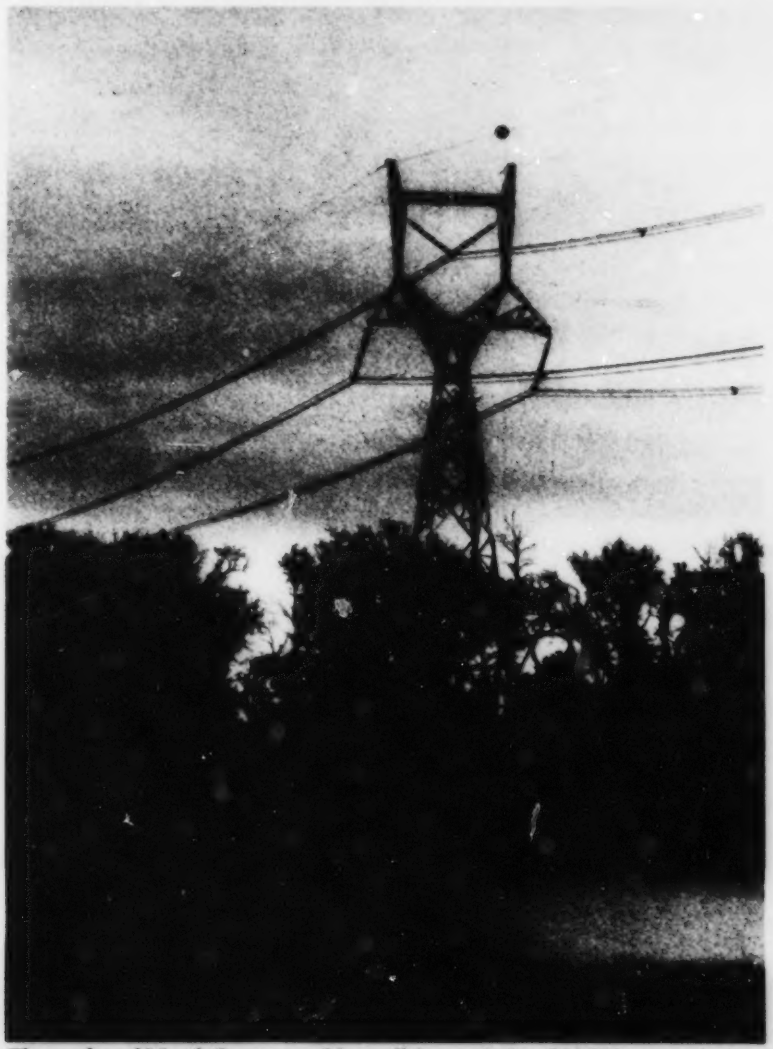
The North Route runs adjacent to more areas of existing rural and suburban residential development than does the southern right-of-way. However, due to the different levels of development within each right-of-way, the perceptions and attitudes of local residents toward development of the Dorsey-Riel Link are likely to differ.

As up to three transmission lines already occupy the northern right-of-way, the Link will represent only an incremental increase in Hydro facilities and in visual impact. The project's aesthetic impact in that area thus might be considered to be relatively insignificant. Link development on the South Route, however, would be the first transmission line to be developed over much of its length. It might thus be considered to involve a more significant visual intrusion on the more intensely populated areas along the southern right-of-way, especially in the section from LaVerendrye Station eastward to Riel.

Heritage Resources

The North Route includes an archaeologically sensitive area along the banks of the Red River. Prior to any construction on the North Route, an investigation would be undertaken of this area and any other protected sites that might potentially be affected. Appropriate measures would then be implemented during project design and construction to mitigate potential adverse impacts on such sites.

To date, no heritage resources have been identified along the southern right-of-way.



The preferred North Route would parallel an existing 500 kV transmission line throughout its length and, in some sections, other existing lines.

The Next Steps

Manitoba Hydro has requested provincial and federal government authorization to develop the Conawapa-Winnipeg Transmission Complex, including the Dorsey-Riel Link.

Regulatory Process

Before approval can be granted, Hydro must submit routing studies and environmental impact assessments for the project. The Dorsey-Riel document and supporting materials are expected to be submitted to the governments in the fall of 1992.

A joint federal/provincial Environmental Review Panel has been established to undertake the regulatory review and to conduct public hearings on the Conawapa-Winnipeg Transmission Complex. This Panel is responsible for making recommendations to the provincial and federal governments. Before any construction work can begin, formal approvals of the Manitoba Minister of Environment and his federal counterpart are required.

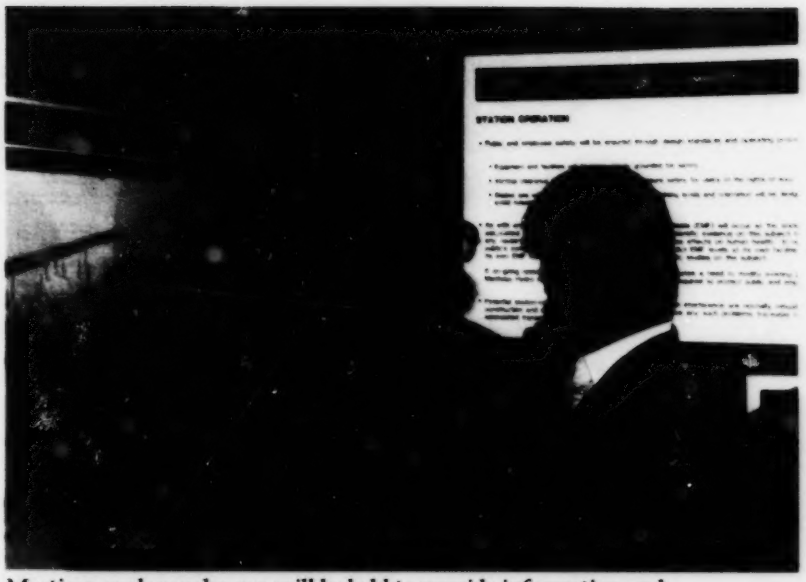
Following public consultation on the Dorsey-Riel Link, Hydro will complete its final route selection and environmental assessment report and request authorization to develop the project.

Public Consultation and Comment

Throughout the regulatory process, members of the public will have a series of opportunities to make their voices heard. The open houses planned to begin in early 1992 represent the next important opportunity for interested parties to provide Hydro with their views and suggestions before completion of the final Dorsey-Riel 500 kV Transmission Link Route Selection and Environmental Assessment Report.

Once this report is submitted to the Panel, it will be available to all persons in preparation for public hearings on the project. Anyone may appear before the Panel in support of, or in opposition to, Hydro's proposals.

Manitoba Hydro looks forward to discussing this project with you.



Meetings and open houses will be held to provide information and opportunities for public comment on the Dorsey-Riel Transmission Link.